



Low-cost and efficient materials for bioelectricity production from waste materials (Bio-e-MAT)

Low-cost and efficient materials for bioelectricity production from waste materials (Bio-e-MAT) is a collaborative project between Tampere University of Technology (Finland), Yildiz Technical University (Turkey), CSIR-Indian Institute of Chemical Technology (India) and Indian Institute of Technology Delhi (India). Bio-e-MAT investigates the use of organic waste materials for biological electricity production in microbial fuel cells (MFCs) that convert the chemically bound energy of the waste materials into electricity via the catalytic activity of microorganisms. This novel energy production technology has not reached full scale application yet.

The main aim of the project is to design a novel MFC with low-cost and efficient electrode and separator materials that can be used for biological electricity generation from waste streams. More specifically, the research aims at 1) developing low-cost and efficient electrode and membrane materials for electricity production in MFCs, 2) developing a novel MFC design, 3) testing the biocompatibility of the electrode materials by enriching and managing open exoelectrogenic cultures from environmental samples, and 4) optimizing electricity production from different waste materials and studying the suitability of the new MFC materials with different waste streams.

The research consortium has expertise on material science, electrochemistry, bioprocess technology, waste water treatment, bioengineering, bioenergy production and microbiology providing interdisciplinary knowledge required to develop an efficient MFC. Development of low-cost and efficient MFC materials and a novel MFC design will be an important step towards industrial bioelectricity production. The use of organic waste materials for energy recovery contributes also to waste management.

Duration of the project is 04/2014 – 12/2017.

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Photo of the group leaders of the research consortium. From left to right Dr. Anil Verma, Prof. Jaakko Puhakka, Prof. Bestamin Özkaya, and Dr. S. Venkata Mohan.

